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a *b* *c*

VIEW FROM HOYT ISLAND, LOOKING ACROSS HUNTON STRAIT TO HOLM ISLAND

Mounts McGee (*a*), Langley (*b*), and Powell (*c*)

VEGETATION ON SOUTH SLOPE OF HOYT ISLAND, AUGUST 15, 1897

THE

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THREE WEEKS IN HUBBARD BAY, WEST GREENLAND

By ROBERT STEIN,

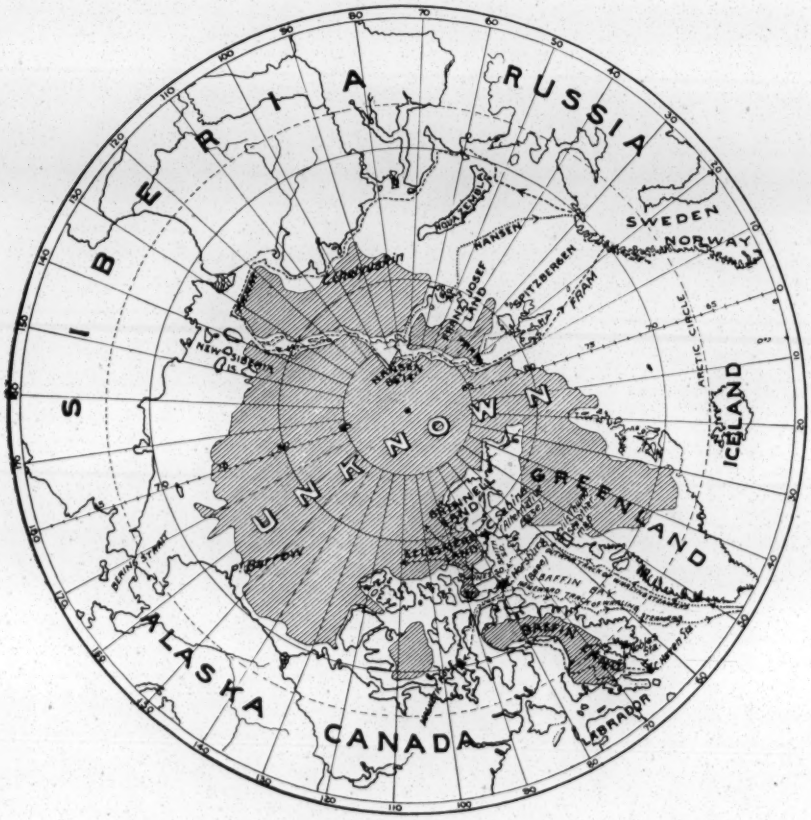
United States Geological Survey

In 1893 I published a plan of Arctic exploration from a base near Jones sound, proposing first to trace the west coast of Ellesmere land and afterward to explore the triangle between Ellesmere and Grinnell lands on the east and the Parry islands on the south. That field was declared by General Greely to be the one in all the Arctic "that promises the largest results with the least amount of labor and danger." Lieut. Julius von Payer declared that the spot selected for the base was "the most suitable" and the plan "thus far the best imaginable." Numerous weighty authorities concurred in this opinion, especially Lieut. Peary, who called the plan "one of the safest, most promising, and cheapest, avoiding hurry, and permitting the utilization of experience." As now planned, the expedition would cost $5,000.

Failing to secure the requisite funds, I decided, by Lieut. Peary's advice, to undertake a preliminary trip to Greenland in order to gain the experience in Arctic exploration which in his opinion would be of most essential service in securing financial support. Through the kind assistance of the late Hon. Gardiner G. Hubbard, President of the National Geographic Society, as well as of Major J. W. Powell, Director of the Bureau of American Ethnology; Prof. S. P. Langley, Secretary of the Smithsonian Institution, and Mr C. D. Walcott, Director of the U. S. Geological Survey and of the National Museum, I was enabled to take advantage of Lieut. Peary's invitation to accompany him

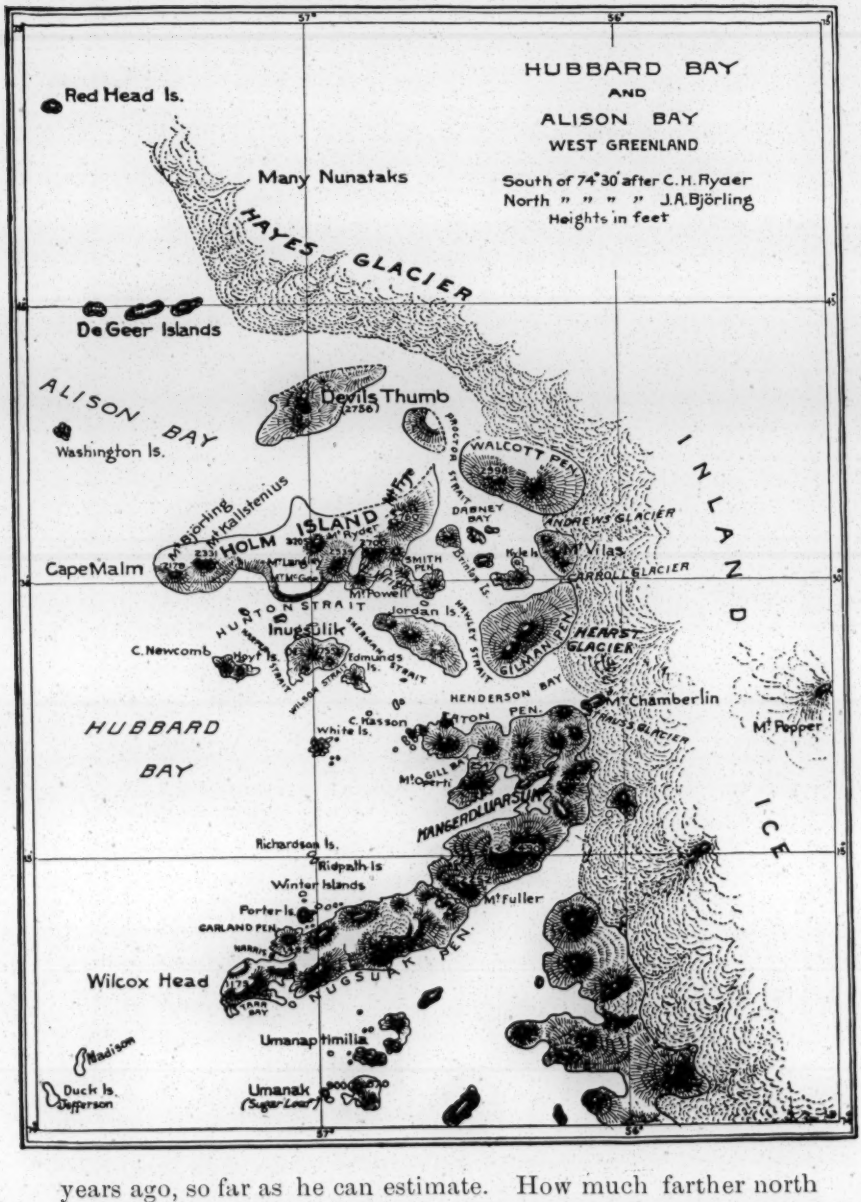
on his seventh Greenland voyage, in the summer of 1897, to spend three weeks in exploration in an interesting field.

Lieut. Ryder, of the Danish navy, explored in 1887 the bay north of Wilcox head (which I have called Hubbard bay), and there found numerous Eskimo remains. The present Eskimos of Upernivik and Tasiusak never until the spring of 1897 ex-



PLAN OF ARCTIC EXPLORATION FROM A BASE NEAR JONES SOUND OR AT CAPE SABINE

tended their hunting trips beyond the great rookery of Cape Shackleton, while the Cape York tribe, according to Lieut. Peary, never go farther south than Melville Monument. This leaves a gap of 140 miles. Inspector Ohlsen, at Upernivik (to whom I am much indebted for valuable assistance) told me that the Eskimos of that colony had a tradition that their ancestors used to go hunting near Wilcox head, but ceased to do so about 200



years ago, so far as he can estimate. How much farther north they had gone he could not tell. Thus the remains found by Ryder were of unusual interest, as representing a stage when the race was unaffected by civilization, except, perhaps, that of the

early Norsemen. To collect such remains was my main object. As Lieut. Ryder sent a collection to the Ethnographic Museum at Copenhagen, I feared that nothing of note would be left at the sites he had touched, and therefore asked Mr Peary to land me at Cape Malm, the north end of Hubbard bay.

With three Eskimos from Upernivik, I was landed on August 10 on a headland supposed to be Cape Malm, the dense fog preventing accurate orientation. From the top I perceived next morning that I was on the island next south (which I have called Hoyt island), separated from Cape Malm by a channel five miles wide, filled with icebergs. As soon as the fog had lifted I prepared to row over to Cape Malm, but when we reached the west end of Hoyt island and saw before us the wild chaos of rapidly moving icebergs, the Eskimos, thoroughly frightened, refused to row farther, even for triple pay. Lieut. Peary had urged me to listen to the Eskimos' advice in regard to ice and wind, and I recognized that under no circumstances must I fail to keep my appointment to meet him on September 1, because such failure would subject him to the inconvenience of having to search for me in those unknown and ill-reputed waters of Melville bay. Accordingly, after ten minutes' parley, finding that their apprehensions were real, I turned back.

I now decided to make a thorough exploration of Hoyt island as the type of a group. The island consists of four mountain masses, the highest about 1,000 feet, separated by deep valleys. Except on the storm-beaten western peninsula, which seemed entirely bare, the southern slopes, where not too near the perpendicular or too smoothly glaciated, are covered with the ordinary Arctic vegetation, blueberries, crowberries, grasses, heather, poppy, dwarf willow, dwarf birch, and an abundance of moss, forming carpets into which the foot sank up to the ankle. Everywhere the sod was sliding down in great, black, wavy avalanches, held together by the tough, peaty fiber, so that plants were often seen growing from vertical or even overhanging surfaces. The summits and the north flank, a succession of nearly vertical cliffs, are almost entirely bare of vegetation. In the shadow of many cliffs lay long snow banks (*aput*), hard as ice, offering considerable resistance to the knife, yet evidently not of many years' growth, since a hollow space beneath them bore witness to active melting. The tinkle of little streams could be heard in many places, but only at one point was there a watercourse sufficiently definite to be called a brook. The summits and sides, where not

CREST WITH BOWLDERS, HOYT ISLAND

too steep, were strewn with glacial bowlders, different from the bed-rock, though eruptive, with the exception of three conglomerates. Glacial striæ were seen on the northeast summit. The whole island is seamed by frost fissures. Many of the projecting pinnacles are weathered into fantastic forms and surrounded by a conical talus of glittering rhombic crystals. In many places the talus formation was so active as to overwhelm the vegetation. Nine freshwater lakes, the largest about 30 acres in extent, were seen, some in the valleys, others on the level summits. They were the favorite resort of the red-throated diver, always seen in pairs, but no other life was observed in them. The life in the sea was exceedingly abundant. Seals were seen nearly every day; eider ducks (*mittek*) in long lines, each numbering perhaps five hundred, were paddling over the water with rhythmic cackle; each cove was alive with little auks (*serpak*), handsome in their coat of black, white, and red, their thin, piping voices seeming curiously out of proportion to the size of the bird. The air was alive with gulls and terns. Wherever the depth of water permitted, the bottom could be seen completely covered with vegetation. Long strings of kelp, when drawn out of the water, were found to harbor quite a fauna of crustaceans and mollusks. A piece of bone thrown into the water would be covered with

shrimps in a few moments. No reindeer were seen, but shed antlers testified to their occasional visits. The snow bunting and ptarmigan found abundant food in the blueberries and crowberries. The blueberry bushes were fairly alive with little black spiders. Several specimens of a hairy caterpillar and of a large fly were secured. Bears had left records of their visits in numerous seal bones, but were not seen, having gone away with the floe-ice.

The same description applies to most of the land in the vicinity. On Inugsulik, the island next east, I found the cairn marking Ryder's farthest north. Great volcanic fissures, 20 to 100 feet wide, between vertical walls, traverse that island in all directions. Being for the most part level-floored, they afford easy thoroughfares for travel. The level floor is evidently due to glacial action, being formed of débris, sometimes angular, sometimes rolled so as to resemble a collection of cannon balls. Successive terminal moraines have converted several of these avenues into stairways. Though much higher than Hoyt island, Inugsulik's summit also is bowlder-strewn. A brook dashes down its west side, large enough to be impassable near its mouth.

CAIRN BUILT BY LIEUT. RYDER IN 1887 TO MARK HIS FARTHEST NORTH ON INUGSULIK ISLAND. MOUNT OPERTI IN THE DISTANCE ON THE RIGHT

Both from Hoyt island and from Inugsulik I had a full view of the inland ice of Greenland, extending as a white band along the eastern sky and discharging through the magnificent Hearst glacier, with a front of 15 miles, casting off enormous icebergs, which completely blocked Henderson bay and came slowly trooping down in a stately procession to join the great muster of their fellows in Baffin bay. Far above the glacier, a nunatak, Mount Pepper, lifted its black head out of the inland ice. Long crevasses on each side showed that the peak was part of a precipitous wall, over which the ice dropped in a cascade several miles long.

On White island, in the center of Hubbard bay, I found at last the main object of my quest—Eskimo remains. There were two houses beside a little lake on a low rocky spur projecting westward, but the main settlement was on the east side, in a most picturesque site, conspicuous afar by the vivid green of the abundant vegetation. Like the Carthaginians, these ancient Innuits had an outer and an inner harbor, separated by a ledge of rocks, over which the tide flowed in and out. The inner harbor was elliptic in outline and about 50 acres in extent. A long knife-edge of rock protected the bays on the south, and so high were the ridges and so deep the bays that the water must remain unruffled in the fiercest storms, unless they come directly from the east. On a level space between the two bays was the settlement, a dozen houses, with graves scattered in among them and along the foot of the hills. Directly behind was a freshwater lake, brown with decaying matter, but a second and larger lake, some 30 feet higher, was clear and pure. A few graves were also found on the south side. Stone fox-traps were scattered all over the island. The eyes of my Eskimos beamed with delight, for to them the snug harbor, the easy landing, the low, level plateau, the freshwater lake within a stone's throw, in the midst of such abundance of animal life, must have seemed a paradise. Where the wave beat had exposed a section of the soil it was seen to consist of a black mass, thickly interlarded with bones of whale, walrus, narwhal, and seal. Evidently the garbage question had not begun to vex the minds of these ancients. So far as I could judge, the houses and graves had remained untouched since their builders departed, though Ryder mentions remains on that island. The roofs had fallen in and the rich humus had given rise to a rank vegetation of grass and moss, which had deeply buried the houses, so that some of them could

SOIL CRACK BEHIND ANCIENT ESKIMO IGLOO, RICHARDSON ISLAND, HUBBARD BAY

only be traced by the quadrangular swellings of the sod. To my disappointment, the bones in the graves were all confusedly jumbled together, so that it was impossible to make out a complete skeleton. As each grave contained several skulls, the disorder was doubtless due to the fact that the bones of earlier skeletons had been moved aside to make room for new arrivals. While I was engaged in the task of spoliation the fog turned into rain, converting the mold into a slimy paste, in which fragments of decayed bones or other material could no longer be distinguished. Fearing to spoil the material of a future and better equipped expedition, which the locality richly deserves, I decided to content myself with the spoils of two graves.

On Richardson island, one of the two low islands south of White island, the graves had been opened, probably by whalers, and the bones scattered about. Of two houses at the water's edge, all but the back wall had been washed away. I was at first disposed to attribute this to subsidence, but wide and deep cracks in the soil showed that the whole mass of peat and muck was slowly sliding seaward.

Similar remains were found on Porter island and (sadly plundered) at Wilcox head, and the Eskimos saw others on the

Winter islands. Ryder mentions remains at Cape Kasson and on the north side of Wilcox head, which I did not see. In a house a little farther south Ryder found "a large white glass bead." This would seem to indicate early Norse influences and add to the interest of the region.

My three live Eskimos were interesting "study specimens." One of them was a blond of the purest type, in whom the admixture of aboriginal blood was so slight as to be imperceptible; the others, though dark in hair and eye, were as white-skinned as Europeans. It is the same throughout Danish Greenland. The whole population is being rapidly Aryanized, and within a few generations we shall have the curious spectacle of a race practically Aryan in blood, and of the finest Aryan type at that, the Scandinavian, yet speaking one of the most primitive of "savage" languages, in which so simple a word as *eight* is expressed by the polysyllable *apennepingazhut*. Some of the young women would pass for beauties anywhere, and one is somewhat shocked at seeing them amid their dingy, desolate surroundings. One peculiarity that struck me as soon as I reached Greenland was the exquisite modulations of the voices of both men and women, constantly reminding one of the French intonations,

ESKIMO FAMILY AT UMANAK

such as you hear them from the lips of cultured Parisians—a soft, almost plaintive, undertone, with no abrupt changes, but merely gentle gliding movements within narrow limits of pitch and volume. Their peculiar "r," *grasseyé* like the Parisian (the word Nursoak is often spelled Nugsoak), completes the illusion.

It affords me pleasure to acknowledge my indebtedness to Lieut. Peary for invaluable assistance and unvarying kindness, and to record my gratification at having been an eye-witness of his management—a model of foresight, readiness, energy, fairness, patience, and consideration. In these qualities one perceives the secret of his magnificent achievement and the guarantee of his crowning success, the conquest of the Pole in 1900.

In naming features which Ryder left unnamed, I have tried to serve a useful purpose by using the names of some of the foremost advocates of a National University at Washington. This may aid in giving to the movement the publicity which, it would seem, is the only thing needed to insure its success.

Washington, Jefferson, and Madison islands, for three Presidents of the United States.

Andrews glacier, for President E. B. Andrews, Brown University.

Carroll glacier, for ex-Governor John Lee Carroll, General President of the Society of Sons of the Revolution, Maryland.

Chamberlin (Mt.), for Prof. T. C. Chamberlin, ex-President of the University of Wisconsin.

Dabney bay, for Hon. Charles W. Dabney, ex-Assistant Secretary of Agriculture, President of the University of Tennessee.

Eaton peninsula, for Gen. John Eaton, ex-U. S. Commissioner of Education.

Edmunds island, for Hon. George F. Edmunds, ex-U. S. Senator.

Frye (Mt.), for Hon. William P. Frye, U. S. Senator.

Fuller (Mt.), for Hon. Melville W. Fuller, Chief Justice of the Supreme Court of the United States.

Garland peninsula, for Hon. A. H. Garland, ex-Attorney General of the United States.

Gilman peninsula, for President D. C. Gilman, Johns Hopkins University.

Harper strait, for President William R. Harper, University of Chicago.

Harris bay, for Hon. W. T. Harris, U. S. Commissioner of Education.

Hawley strait, for Hon. Joseph R. Hawley, U. S. Senator.

Hearst glacier, for Mrs Phœbe A. Hearst.

Henderson bay, for Hon. J. B. Henderson, ex-U. S. Senator.

Hoyt island, for Hon. J. W. Hoyt, ex-Governor of Wyoming, Chairman of the National University Committee.

Hubbard bay, for Hon. Gardiner G. Hubbard, first President of the National Geographic Society.

Hunton strait, for Hon. Eppa Hunton, ex-U. S. Senator.

Jordan island, for President D. S. Jordan, Stanford University.

Kasson (Cape), for Hon. John A. Kasson, ex-U. S. Minister to Austria and Germany.

Kyle island, for Hon. James H. Kyle, U. S. Senator.

Langley (Mt.), for Hon. S. P. Langley, Secretary of the Smithsonian Institution.

McGee (Mt.), for Prof. W J McGee, Ethnologist in Charge, Bureau of American Ethnology.

Newcomb (Cape), for Hon. Simon Newcomb, ex-Director Nautical Almanac

Pepper (Mt.), for Dr William E. Pepper, ex-Provost of the University of Pennsylvania; President of the Museum of Science and Arts, Philadelphia; President of the Pan-American Medical Congress.

Powell (Mt.), for Major J. W. Powell, Director of the Bureau of American Ethnology; ex-Director of the U. S. Geological Survey.

Porter island, for Gen. Horace Porter, U. S. Ambassador to France.

Proctor strait, for Hon. Redfield Proctor, U. S. Senator.

Richardson island, for Mrs Ellen A. Richardson, President of the George Washington Memorial Association.

Ridpath island, for Dr John Clark Ridpath, Editor of the Arena.

Sherman strait, for Hon. John Sherman, Secretary of State; ex-U. S. Senator.

Smith peninsula, for Col. Wilbur R. Smith, Kentucky University.

Strauss glacier, for Hon. Oscar S. Strauss, ex-U. S. Minister to Turkey.

Vilas (Mt.), for Hon. William F. Vilas, ex-Secretary of the Interior; ex-U. S. Senator.

Walcott peninsula, for Hon. C. D. Walcott, Director of the U. S. Geological Survey.

White island, for Hon. Andrew D. White, U. S. Ambassador to Germany; ex-U. S. Minister to Russia.

Wilson strait, for Hon. William L. Wilson, ex-Postmaster General; President of Washington and Lee University.

Wright (Lake), for Hon. Carroll D. Wright, U. S. Commissioner of Labor.

Besides these, the following names were deemed appropriate:

Mounts Björling and Kallstenius, for the two young Swedish explorers who were lost in an attempt to reach Ellesmere land in 1893. The two peaks were ascended by Björling in 1891.

Mount Ryder, for Lieut. Ryder, of the Danish Navy, the first explorer of Hubbard bay. The peak is the highest that he sighted from his farthest north.

Mount Operti, for Mr Albert Operti, the "Arctic artist," who accompanied Lieut. Peary on two expeditions. A cairn erected on the peak by Prof. Gill in 1896 was named after Mr Operti. The peak was erroneously called Devil's Thumb by Ryder. The real Devil's Thumb is in Alison bay.

Gill bay, for Prof. Gill, of the Cornell party of 1896, who ascended Mount Operti, overlooking this bay.

Tarr bay, for Prof. Tarr, the leader of the Cornell party.

THE SAMOAN COCOANUT*

Samoa, the Navigators islands of the old geographies, is a volcanic group, consisting of four principal islands, lying between 13° and 15° S. latitude and 168° and 173° W. longitude. Samoa has an area of about 1,300 square miles, in size between Rhode Island and Delaware. Apia is the single port of entry. Savaii, the most westerly island, is much the largest, 45 miles in length by 25 in breadth. Upolu, 12 miles to the east, is 40 miles in length by 15 in breadth. Tutuila, 38 miles east of Upolu, is 17 miles in length by 5 miles in breadth.

The entire export from Samoa for 1894, excluding bonded goods and other re-exports, was $254,630; of this total, copra (dried cocoanut meat) constituted $248,570. The single exportable staple for which Samoa is eminently adapted, and the one upon which all its business today rests and must for the future be predicated, is the cocoanut (*Cocos nucifera*). It is to Samoa what cotton and corn are to the United States; all that grain, meats, and wool are to the Australasian colonies. The export of the copra (the dried meat of the cocoanut) alone, save with trifling and inappreciable exception, represents the entire agricultural productive capacity of Samoa, and through this source every dollar that trade and commerce bring into these islands finds its way. Were the cocoanut crop an absolute failure for a single year, the entire volume of export of this Kingdom for that year would not amount to more than $6,000. This illustration will adequately represent the prime importance of this single article to the country and its needs.

Like other primitive peoples depending largely on a single resource, the native Samoans have a tradition or myth concerning the origin of their most useful plant—the cocoanut palm; and the myth is peculiarly interesting as an illustration of the inconsequence of ideas in primitive tradition. This myth, with many others, was collected by Mr William Churchill, for some years consul-general to Samoa, who has recently returned to Washington. To understand the myth it is necessary to remember that the

*This article, compiled by Gen. A. W. Greely, is composed mainly of excerpts from the interesting and valuable report on Samoa made to the Department of State by Consul-General James H. Mulligan, and published in Consular Reports, vol. 51, pp. 656–748.

water vessels used by the Samoans consist of cocoanut shells in pairs, connected by cords in such manner as easily to be slung on a stick laid across the shoulders or conveniently carried in the hand, the shells being emptied of their original contents by the simple and effective method of knocking out the "eyes," drinking the milk, and then permitting ants to consume the meat. One of the apertures produced by removing the "eyes" serves as the mouth of this natural jug, which is remarkably light, strong, and durable, and has accordingly relieved the Samoans of the necessity of developing the art of pottery-making. Although so convenient in many ways, this type of water vessel is not easily filled, particularly from a shallow stream or spring; but the Samoans have invented a neat device, by which this difficulty is easily overcome. The maiden who goes to the spring carries with her a cup made from the stem end of a cocoanut shell, with one of the "eyes" removed, so as to transform it into a funnel. This she dips in the water with her finger over the aperture, then, holding it over the neck of the cocoanut jug, removes her finger and directs the stream into the carrying vessel. These utensils—the pair of cocoanut jugs and the cocoanut funnel—have well-established names in the Samoan tongue, and these names apply to no other objects, while the utensils are never made of other material than cocoanut shell. Now, according to the tradition, a village virgin of the long ago went down to the spring for water. While dipping with her cocoanut funnel and directing the stream into the cocoanut vessel she perceived a slender, shadowy eel in the water, and was so entranced by its beauty that she decided to carry it home in the funnel cup and preserve it as a pet, and this she proceeded to do. As time passed the creature grew, and it became necessary to remove it to larger and larger receptacles, until finally it became a terrific monster, threatening to destroy the people. So the people gathered, and, under pretense of placating the monster, supplied it so freely with a Samoan beverage that it became intoxicated and slept. Then they cut off the monster's head, and, to prevent reclamation of this useful organ when the creature should awaken, removed it to a distance and buried it deeply in the earth. Their virtue was duly rewarded when, some time later, the earth swelled and opened, and a strange plant pushed out, delicate in form and graceful in movement as the eel in its infancy. And this magical plant was the first cocoanut tree.

It was the cocoanut and cotton—chiefly the former—which induced a large purchase of lands by a German firm and the planting of some extensive plantations. Twenty to thirty years ago, when the oil of the cocoanut began to be more largely employed in the manufacture of soaps, copra commanded in Europe, where it found its only, and still finds its principal, market, very remunerative prices, which in these times of decreased values in everything are looked back to as phenomenal. These high prices stimulated the planting of these thousands of acres of tossing palms which reach on before the eye in unmatched beauty. But the same stimulus which induced this manifestation of enterprise was felt on every tropic seashore. Millions of trees were planted on the measureless shores of tropic Africa, America, and Asia. All the shores of India, of the contiguous countries, of the unnumbered islands that form the archipelagoes of the vast western Pacific, were transformed into stately groves in the keen search for large profits.

These groves are but a few years past their early maturity. Every year, with favorable season, they yield an increasing crop. The usual reaction has followed. The same result in these latter times of increased output in everything has been reached, and overproduction is steadily bearing prices downward. In addition came the introduction of cotton-seed as an oil-producer. This tells upon Samoa in more than a direct way. No plantations are being laid out. What has been said before in regard to other productions and the great distances of the markets on either side is applicable to the situation of Samoa with reference to its single staple in redoubled force. Distance, to repeat, is synonymous with freight rates. Other copra-making countries are situated nearer to the markets. A lower freight means a lower cost to the purchaser. Again, a small and semi-civilized population, indulging few artificial needs, offers a small market for imported goods; consequently ships to larger countries can carry a cargo out, to return with a cargo of copra. Vessels cannot, save in exceptional, rare cases, find a charter to Samoa. As a result, the Samoan shipper of copra must pay the high rate of steamers regularly calling or pay such a price for transportation as will justify a sailing vessel to come, perhaps partially in ballast, to carry away a cargo of copra.

In this respect the German firm enjoys an advantage, as it does in many other things, for, doing for the country a rather large business and supplying the German men-of-war with coal,

it can so adjust its shipments as to offer a vessel a charter both ways, to the great reduction of freight charges. It follows that these advantages of the larger concern tend greatly to continue in a measure the monopoly it once conspicuously enjoyed, to the disadvantage of smaller shippers.

Copra is simply the meat of the cocoanut, dried in the sun, generally by being spread on mats, until the greater part of the watery juice is evaporated. For this purpose the nut is left to thoroughly ripen—that is, until the white flesh, or kernel, which lines the inside of the shell to the thickness of three-fourths of an inch or more, reaches that degree of hardness found in cocoanuts sold at the fruit stands in the United States. At this state all the clear, palatable water which completely filled the interior in the green stage is absorbed.

When a commercial demand for cocoanut oil first sprang up, and shipments were small, it was customary to ship the pure oil in casks, free of the wood or fibrous residuum. It was then bought by the traders direct as oil from the natives, who secured a separation of the oil by allowing the green copra to stand exposed to the sun in canoes—troughs, as it were—until the heat and decay set the oil free to collect at the bottom, to be afterwards strained.

No oil has been so shipped for a great many years, and the one mill set up for extracting the oil mechanically was not a profitable venture. Cooperage could not be had here, and the importation of casks was found too expensive. Then the leakage in a long voyage in wooden packages was found to be very great. For many years the oil cake obtained from cocoanuts met a ready demand from dairymen and small farmers in Europe as a food for cattle, but latterly it has fallen into disfavor, the opinion obtaining that it is productive of derangement, if not of disease. The decline of this use has to some extent affected the price of copra. It was formerly estimated that the sale of the oil cake paid the cost of the freight on the bulk copra.

Marseilles is the principal manufacturing point of cocoanut oil, but large quantities are shipped to Liverpool, to ports on the Baltic, and to San Francisco. The oil is used to some extent by admixture as a lubricant, but its chief use is found in the manufacture of common and medium grade soaps. Its tendency to become rancid—an objection which has not been entirely overcome—is a serious hindrance to its employment in many things, and precludes its use in the manufacture of the

better grades of soap, for, free of odor as it may be at first, its pungent rancidity is apt to become soon manifest. The odor of copra, especially when stored in bulk or on shipboard, is of the most disagreeable and nauseating character.

The accepted method of latter years is to plant the cocoanuts in rows 40 feet apart, setting the trees 30 feet in the row. The early planters placed the trees 20 feet apart each way, and many years were required after they came into bearing to show that the planting had been done too closely. The nuts were small and not so abundant as they were on trees scattered widely apart. Taught by this observation, the groves were thinned by cutting away a liberal percentage of the trees, to the considerable improvement of the yield. The cocoanut, of all things, loves the sunshine and free circulation of the air. Indeed, to flourish in perfection it should stand on the outer verge of the shore, its roots striking into the sea water, its branches or palms ever whipped and tossing in the stiff breeze of the trades. It finds its habitat close to the sea, where the salt-impregnated air can reach it freely and in abundance. Like some other members of the vegetable kingdom—for instance, clover—it seems to take a part of the elements of its growth from the air, but that air must be at the high temperature of the tropics and saturated with the salt moisture of the sea. The cocoanut is so much the creature of the sunshine and the sea that it clearly manifests its removal inland in a reduced crop of smaller nuts. The lowlands of the beach on all these islands are more or less covered with the groves, while on the mountains and highlands no tree is found. The smaller size of the trees and the poorer yield are plainly to be noticed on lands at an elevation of from 400 to 600 feet, situated at as short a distance as 2½ and 3 miles from the shore. Standing immediately on the beach, the tree inclines outward over the water; growing inland, it points by its leaning ever in the most direct way to the sea.

The nuts ripen along throughout the year, hanging in pendent clusters close in and around the stems of the palm branches, which spread about on all sides and reach upward from the clustered head forming the top of the tree. The nuts hanging lowest ripen first, the young nuts continually appearing above with the growth of the tree, and so the lower branches wither and dry, falling away as the younger branches push out from above. The body of the tree from the ground to the crown at the top, a distance reaching up from 30 to most frequently 60

and even 80 feet, is smooth and bare like a mere pole supporting a head of nuts and sweeping branches.

The trees come into bearing, in a small way, at the sixth year on suitable soil, and are believed to reach the full limit of production at from 15 to 20 years of age. Many groves known to be 30 and 40 years of age are now bearing in undiminished abundance, and they so continue to do to a great age. Persons who profess to be able to determine the age of trees by the marks left on the bark where the branches have successively fallen estimate in this way that many still vigorous trees are 70 and 80 years of age. Natives who are peculiarly intelligent in so many ways, but who appear to be, for reasons not difficult to understand, peculiarly unable to keep account of time, say that the cocoanut tree will live on beyond a hundred years. In all probability they live to a considerably greater age on the beach lands when the trunk has escaped serious injury.

Springs, while frequently met with, are not abundant, and for fresh water for all purposes reliance is had on the small streams coming down from the mountains. With few exceptions, the natives are not practical or provident enough to provide tanks for the storage of rain water, as is universal among the whites; indeed, the formation and material of the roofs of native houses would make it very difficult to catch rain water from such roofs. As villages are often at considerable distances from natural supplies of fresh water, and as these in the dry months of May, June, and July often become exhausted, recourse is had to a very barbarous method of supplementing the supply of fresh water. Cocoanut trees nearly always incline at an angle more or less oblique. On what may be termed the upper side of the tree, or that opposite to the direction in which it inclines, large cup-shaped notches, similar to those made in the long-leaved pine for turpentine purposes, are cut. With every shower the water trickles down the body of the tree; being caught in these troughs or notches, it serves to fill the cocoanut drinking shells or bottles, the only vessels for holding water they employ; for, except in a few instances, they are slow to adopt buckets or other containin vessels common in civilized life.

The cocoanut tree is capable of surviving a great deal of in jury; in fact, it maintains its vigor despite such injuries as would be ruinous to most trees of the temperate climes. Trees are often seen flourishing in undiminished vigor, although notched half through in the way described in two and even three places.

While these unpardonable injuries are sustained without apparent detriment for a long time, they bring about the certain result when the tree becomes old. The surface of the cut becomes decayed, and this, once set in, progresses on into the tree until it can no longer sustain its weight or withstand the high winds of the stormy season. All trees are by no means so injured, but a sufficiently large proportion are thus mutilated in time as to bear manifestly on the total production.

The habit of the cocoanut to reach out over the water seems to be a provision of nature for its propagation and distribution. The nuts, falling into the sea, will float for weeks in the bitterly brackish waters of these tropic seas without injury to the germinating quality. Once thrown upon the warm sands of a beach or tossed by a wave upon the reef above the surface, it soon puts forth its palm from the smaller end, while from the round and larger end the tender roots strike into the soil or decayed coral, as the case may be. Many lagoons which have risen within living memory and which for years remained without sign of vegetation are now covered with the cocoanut, although hundreds of miles from other islands.

The value of the cocoanut is not confined to the single export product, copra. The tree and its products are devoted to many uses. The wood in the green state is very porous and spongy, having consequently a great degree of resistance to rifle shot. In the native wars in the past it was much employed in the building of defensive works. When thoroughly seasoned, it lasts for a long time under ground and is valuable for all purposes for which posts are employed. The oil enters in many forms into the domestic uses of the natives. It forms the basis of all their liniments and emollients in their simple but very rational pharmacopœia. It is used for anointing the body, a practice universally observed and in such a climate by no means so unreasonable as it might appear at the first glance. It has the effect of keeping the skin soft and fine, protecting it from sunburn, which in these latitudes of a vertical sun, without protection, becomes very severe. It serves as well to repel mosquitoes and other small flying insects. Highly perfumed with the odor of the Moso'oi, it is the general dressing for the hair, in the care of which these people are very particular and cleanly, as they are in nearly all matters.

The nut is one of the standard articles of diet. Breadfruit, taro, bananas, and cocoanuts form the staple articles of food,

ranking in importance in the order mentioned. The nuts are eaten in the soft, but somewhat tough, gelatinous state, before they reach the woody condition in which they are familiar to the American people, when they are both palatable and exceedingly nutritious. From what has been said, they are, of course, to be had in this state of ripeness at all seasons.

In this condition they enter into the preparation of many cooked dishes, the choicest of which is "palusami," a most delicious preparation. The water of the half-ripened nut, at the state of ripeness mentioned, which so completely fills the cavity that it spurts out on the shell being penetrated at the "eye," forms a pleasant and wholesome drink, ample in quantity and curiously cool. The whole shells, from which all the meat is removed by being left first to decay and then by being shaken a long time half filled with coarse sand, forms the universal water bottle; cut in half, they are made into bowls and drinking cups. The fiber, as has been said, furnishes all the sennet or braided twine and rope for all uses. The leaves of the great branches, which dry rapidly, are used for kindling, for torches in fishing, and a small fire made in a bowl of burned clay set in the floor of every house as a fireplace, when regularly fed with these long and combustible leaves, furnishes the light to the household, of a cheery and attractive kind. Again, the small ends of the long branches are tied together in couples, and, the butts being flat and heavy, they are hung across the combs of the roofs of houses and serve admirably to hold the thatch in place against high winds. These branches by a trick, as it were, are stripped down either side and soon plaited into baskets; treated and plaited much in the same way, they are made into the curtains, or more properly sidings, by which all houses are inclosed and protected.

Were the cocoanut tree by some destructive blight eliminated from Samoa at a stroke, all its export would be at an immediate end, and it would be difficult to see how its domestic life could adjust itself to meet the calamity.

It is generally estimated that an acre of land should yield, when the trees have reached the period of full bearing, about half a ton of commercial copra. As in most other agricultural estimates, in which, it seems, result remains so stubbornly at variance with calculation, this one cannot be reconciled with the crop had from any particular plantation. Still, managers and owners adhere to the estimate and furnish a ready reason when

the estimate fails of fulfillment. Green copra—fairly dried and liable to much shrinkage—is worth, and has been for some years past, in spite of a constantly declining foreign market, 1¼ cents a pound when bought from natives. If the estimated production held good, this ought to yield $13.75 per acre; but again the estimate usually places the yield at about $12 per acre, possibly no great difference, as such things go. It will be observed this allows nothing for labor.

Without attempting to reconcile the apparent differences, it is said that a tree is on the average "worth a shilling a year"—that is, yields a profit to that amount. Planting in the manner I have mentioned, an acre would carry about forty-eight trees, and if these yielded the estimated shilling each, or 48 shillings in all, the calculation of $12 per acre profit would be quite well sustained. However the estimates may conflict, however overdrawn they may be, if any—and I am of opinion that, like all similar calculations, they are more encouraging in theory than reliable in practice—they at best do not show a greater profit per acre than with ordinary prices—not those of the past year—may be reasonably anticipated in any of the eastern central States from corn or wheat. As a matter of fact, a very average crop of tobacco, in any of the States growing that staple, would prove more profitable than do the ideal cocoanut groves of the picture islands in the books of travel. True, the trees once planted are producers far beyond the limit of the ordinary lifetime, while the farm crops mentioned are to be laboriously cultivated year after year. On the other hand, many profitless years elapse in waiting for the trees to reach maturity. Even then, in a country where wages are high, because everything else is as well, expense claims a liberal share of the product, for "making copra" is at best a slow and laborious process, although there is but a single planting and no cultivation. Back of all this must be remembered the serious expense of clearing original bush.

Copra is continuously made, as the nuts ripen, from about the middle of April till the middle of October or early part of November—that is, during the dry season—but the making is more active in July, August, and September. Curing could be done, so far as the supply of nuts goes, through the remainder of the year, but the rains, varying from frequent to almost constant, do not permit of drying.

A boy or man, generally the former, with a piece of sennet about 18 inches in length, looped on either foot, will climb the

slender, swaying tree with as much ease and rapidity as if it were a ladder. The notched or corrugated surface of the bark, left where branches have in time grown, from the ground up, catches the bit of sennet between the feet, while the weight of the body pressing downward clamps, as it were, the hollow of the ample feet firmly on either side of the trunk. By this means the tree is ascended by a series of jumps, as it were.

In some of the South Sea islands, where onerous taxes are levied in return for the supposed protection afforded by European nations which have annexed them, a boy is accounted as having become a man, liable to the payment of capitation tax, when he is able to climb a tree.

The climber, with a large knife, cuts away the matured nuts which cluster close about the butts of the branches. As they fall they are gathered into piles about the base of the tree. On the plantations they are gathered into panniers slung on donkeys, or into baskets swung on poles borne by two men—after the style in which the tea boxes were carried with ease over the perpendicular mountains by the two little Chinamen on the old blue china of our grandmothers—to be finally piled into great heaps near the copra shed. The nuts are not husked, the thick outer husk having become hard and brown like wood. They are dexterously split in two by an axe and the hard white flesh is more dexterously cut out with a large knife. Nothing remains but to spread it on mats or boards in the sun. When cured it is thrown into a heap in the shed, where it remains until sacked, to be laboriously carried, sack by sack, by wading out to the small boat, which in turn transfers it to the small schooner or cutter lying in deeper water, and from this in turn it is again taken to be stored elsewhere or transferred to the deep-sea vessel for its final voyage.

Copra yields perhaps a greater percentage of oil than any other of the great oil-producing staples, under the modern process, whereby it is mixed with water, heated, and subjected to two pressings, giving as high as 62 and 64 per cent of pure oil.

The cocoanut crop of last year (1894) was by far the largest ever known in the islands; for this, like all other crops, has its unaccountable years of great abundance and those of small production, as little understood. The yield of last year is all the more remarkable when it is borne in mind that the war of 1893, which ended in the deportation of Mataafa, worked a great and barbarous destruction of trees in the western district of this

island, known as Aana. The extent of this increase, despite the unfortunate destruction referred to, is illustrated by the fact that while the export of copra in 1891 amounted to 4,842 tons, in 1892 to 4,871 tons, and in 1893 to 4,602 tons, it rose last year to 6,214 tons, an increase of 1,612 tons over the year before—an increase of about 33 per cent over the years 1891 and 1892; yet under the reduced price of late years the larger crops fail to bring into the country as much money as did the far smaller crops of former years.

Copra is bought from the natives, who make and sell it in small quantities, selling as it is made almost entirely for trade—canned meats, biscuits, prints, boat lumber, and other articles suited to their few needs. Cash is rarely paid, but part cash is often paid, and sometimes the price is required in money. In the trading stations in other islands and in outlying districts enormous profits are made; but frequently, the business being small at best, the trader could not subsist or make a profit for his principal, as he is generally an agent, unless such an advance on cost price was made as would be regarded in a town in the United States as prohibitory. In Apia, with its competition of several stores and small dealers, prices are far more reasonable, although they are far from being such as to threaten the dealers with bankruptcy. From the political situation now existing, and which, with mere intervals, has endured for the greater part of three years, the natives of many of the most productive districts dare not come to do their trading in Apia, and hence are thrown back in buying and selling upon the country trader. Of course, in the end all the goods sold and all the copra made comes from or finds its way to Apia, so that from this cause its business is not diminished; yet this condition is distressing for such business men as confine their transactions to Apia. With such houses as are sufficiently extensive to have stations in the hostile districts, which they keep supplied from central stores here, the prevailing situation of affairs is very satisfactory, and it is not unlikely that some of them are well satisfied with it and will not fail, in a quiet way, aided by many advantages, to contribute to its continuance.

Copra buyers pay now, as they have done for a few years past, $1.25 to natives and $1.50 to white men, who sometimes make, but generally buy from natives. The traders insist that the natives bring the copra too green or conveniently overturn the boat that the weight may be greater. To protect themselves

against such imposition, as they term it, they have their scales set to keep watchful guard over their interests or are provided with a set of false weights—generally the latter—for the natives watch the weighing with keen eyes, sharpened by sad experience. I have heard this practice warmly defended; but it should be said there are some honorable exceptions.

Recently in a trial had in the supreme court between a firm of this place and one of their agents it was shown that the firm had furnished the agent, along with the scales, a set of correct and a set of false weights. This did not seem to excite surprise or unfavorable comment, while the revelation of the fact was regarded as amusing.

The increase in the American consumption of copra is very gratifying. None was shipped to the United States in 1891 or 1892. In 1893 the value of copra shipped to San Francisco amounted to $1,259; in 1894 to $30,400, and the declared value of that shipped to the same port for the year ended June 30, 1895, was $45,486. Every steamer for the last-named port now takes a shipment. Consignments by this steam transportation are made at a high freight rate. But one sailing vessel has cleared from this port for any American port in a year. By far the greater importations into these islands come from the Australasian colonies, many reasons combining to produce this result. Were there sufficient outward traffic from San Francisco to employ sailing craft, such vessels could afford to carry copra on the return voyage at such a rate as would largely increase the shipments of Samoa's only export to America; for steam rates on so bulky an article over so long a distance approach the prohibitory.

The latest advices (1895) from Liverpool quote copra at $52.50 per ton. This is thought to be too low commercially, and a recovery is expected to $58 or $60 per ton, and these latter figures are thought to fairly represent the present real value. The price has never before reached so low a figure. During 1870–'71 the price was about $115; as late as 1880 it was from $75 to $85; since which time, with occasional recoveries, it has continued to decline until it reached the figures stated.

The freight to England is about $12.64½ per ton; to San Francisco, to which shipments are beginning to be made, $10 by steam and from $6 to $8 by sail, when the few opportunities occur. From Ceylon and places similarly situated charters can be had for at least half these rates. In the era of high prices

$25 and $30 per ton carriage was freely paid, and the price paid by traders in Apia was 2½ to 2¾ cents per pound in buying.

But since 1878 seventeen years have elapsed. During all these years thousands of trees then not planted have come to maturity and are bearing, and thousands of those then in early bearing have greatly increased their yield. As has been said, the crop of last year (1894) was the largest in the history of the islands, amounting in all, as stated, to 6,214 tons, and yet an official report made to the United States Government in 1878 gives the export for that year as 6.775 tons, when in fact it could have been not greatly in excess of half that quantity. The same report estimates the cotton crop at 2,300 bales. Such is a sample of the unreliability of the statistics which have so misinformed the world as to this group; upon such unstable foundations rest so many of the roseate theories as to their future.

THE MODERN MISSISSIPPI PROBLEM

By W J McGee

The great river of the continent has been the object of intelligent inquiry for a century, and of scientific investigation for half as long. The earlier inquiries related chiefly to the river as a medium for inland navigation, and the problem of interior water transportation in America has wrought itself out largely on this river with its principal tributaries. The history of the solution of the problem is significant in its bearings on future industry and commerce.

The canoe of the Indian and the pirogue of the pioneer were followed by the scows or "flatboats" which marked the introduction of real commerce by means of the river; and before the introduction of steam the custom grew up of building "flatboats" along the upper waters, lading them with coal, grain, and other produce, floating them with the current to New Orleans, and there abandoning them, while the shippers returned overland. About the end of 1811 the first practical steamboat on the waters embouching through the Mississippi suffered disaster during its first voyage in consequence of the New Madrid earthquake; but the utilization of steam power proceeded rapidly, and within a few years steam navigation was established and the river became a route for numberless craft carrying freight and passengers against

the current nearly as rapidly as with it. Thus began the palmy period of the Mississippi as a line of commercial activity; towns were planted on the upper river and along the Ohio, and especially below the confluence; Columbus, Hickman, Vicksburg, Grand Gulf, Natchez, Bayou Sara, Port Hudson, and a dozen other towns whose names are half forgotten, sprang up along the riverside and promised to become metropoles, while the passenger packets became floating palaces, representing the acme of luxury in American travel. Knowing nothing better, merchants and shippers were content to endure the interruption of traffic by floods, and were too dazzled by glowing anticipations to note the building of bars between their warehouses and the main channel or the undermining of their town-sites by the ever-shifting stream. Then came the locomotive and railway, affording the means of swifter and surer transportation, and the river commerce began to wane, relatively if not absolutely; a third of the river towns were deserted by the stream, a quarter were invaded by the current, and only a third or a quarter were reached by the railways and permitted to thrive under the new conditions. For a time the river held the balance of power between rival lines and modes of transportation, and thus controlled tariffs (indeed this is in some measure true today), but successively larger and larger shares of the traffic were diverted. Recent statistics show that there is still a considerable transportation of coal, grain, and other bulky and indestructible commodities by the river, though the ratio of river carriage to rail carriage is steadily decreasing; today the flourishing river towns are also railway towns, and depend primarily on land transportation for their commercial supremacy; today the old-time floating palace is but a memory, and today only two, or five, or possibly ten packets pass the point where twenty passed a quarter-century ago.

Meantime the inquiries concerningthe great river have changed. Today the practical importance of the lower Mississippi lies in its fertile bottom-lands and in the agricultural and commercial industries which they support; and since these are affected by floods and other fluctuations of the river, the water stages have become paramount as subjects of investigation. The researches concerning the regimen of the river began while it yet retained prime importance as a navigable waterway, and yielded one of the earlier scientific classics of America in the monograph by Humphreys and Abbot, issued in 1861. These hydrologists were concerned chiefly with normal conditions rather than ab-

normalities, with means rather than extremes; and their masterly treatise remains the guide of students throughout the world. The principles developed by them were subsequently discussed and applied by an important federal commission; while the problem of maintaining an open passage from the river to the gulf for vessels of deep draft was solved experimentally by Eads in a manner eminently satisfactory to long-distance commerce. As the vast and fertile bottom-lands attracted the planter they were gradually reclaimed, the plantations extending quite to the river banks; and to meet local and temporary needs (at least in part in every case) the natural levees built by the river were raised artificially to protect plantations and towns. These levees interfered with the natural regimen of the stream in some measure; they checked the annual flooding of the bottoms, such as has enriched the valley of the Nile, and at the same time prevented the river from shifting to the lower grounds as its bed was built above the level of stability; in short, they initiated the transformation of the waterway from a natural river to an artificial canal. A direct and evident consequence of the change was to render the floods more disastrous when the stream burst its partly artificial barriers, and this led to a demand for building the levees higher and higher and extending them further and further along its banks; it also led to recognition of the importance of floods as agencies affecting the material development of an extensive and rich section of the country. So the burning problem of the Mississippi today is not that of navigation, not even that of normal regimen as a great river, but that of the floods to which the stream is subject.

Accordingly certain recent researches of the Weather Bureau are most apposite and timely.* The report in which they are made public is a straightforward and largely statistical presentation of the facts pertaining to the floods of the Mississippi, especially the notable flood of 1897. The material is arranged in four sections. The first relates to "The River and Basin," and sets forth the physical characteristics of the entire watershed as ascertained from various sources. The second section treats of "Normal Precipitation and Drainage" throughout the basin as determined from the records of the Weather Bureau, which comprise practically all the meteorologic observations extant. Then

* Floods of the Mississippi River. Prepared under direction of Willis L. Moore, Chief of Weather Bureau. By Park Morrill, Forecast Official in Charge of River and Flood Service (U. S. Department of Agriculture, Weather Bureau. Bulletin E). Washington, 1897. 4°, pp. i–vi + 1–79, pls. (i, ii unnumbered +) 1–58.

follows "The River in Flood," in which the relation between precipitation (including the fall and melting of snow) in every part of the basin and the ensuing floods is discussed quantitatively. The fourth section deals with the "Spring Flood of 1897," and applies the principles and relations developed in the more general discussion. The text is amply illustrated by means of charts and diagrams. The discussions are brief, deductive in character, and limited to exposition of the facts recorded; they do not (perhaps unfortunately) extend to the consideration of the levee problem, or to that gradual increase in the frequency and height of floods indicated by the figures—especially those of table xviii, pages 34–37—and undoubtedly attending the heightening of the levees, whether as cause, as effect, or fortuitously—indeed hardly a word appears in the report concerning that association of levees and floods which constitutes one of the important American problems of the day.

The carefully drawn flood-map (plate 2) is especially interesting in view of the disasters still in the minds of patrons of the press; and it is interesting to geographers as giving a bird's-eye view of features recording stages in the development of the region. Among these may be noted the linear arrangement of alluvial belts, especially in the upper third of the embayment, an arrangement strongly suggesting the initiation of mountain corrugation; also the lifted area about New Madrid, which was heaved some twenty feet above the general level of the bottom during the earthquake of 1811–'13; and, too, the diversion of the flood from the course of the river in large districts.

OUR FOREIGN TRADE

Every nation, just as every individual, finds it necessary to sell some of its own products and to purchase others from foreign nations. Some nations find it necessary to purchase more than others, since some produce only a few articles, while others produce almost everything they require. Thus Australia produces mainly mutton and wool, and finds it necessary therefore to exchange these for other necessities of life. On the other hand, the United States, which has a wide range of climate, produces most of the commodities which her people require, and her foreign trade is therefore by no means as great in proportion to her population as that of many other countries.

During the fiscal year 1896–'97, the sum of her exports and imports had a value of 1,816 million dollars. Large as this sum is it is small compared with the foreign trade of the United Kingdom, France, or Germany. Of this great sum, 765 millions, or about two-fifths, were imports. The difference between them, the "balance of trade," was in our favor to the extent of not less than 286 million dollars. In other words, we sold 286 million dollars' worth more than we bought. The principal articles which were sold were cotton, wheat, meat, petroleum, tobacco, and manufactured goods. Those purchased were mainly sugar, coffee, and manufactured goods.

In carrying on this enormous traffic the port of New York plays by far the most important part. Just about one-half of our foreign traffic passes under the shadow of the Goddess of Liberty on Bedloes island. Two-thirds of our imports and more than one-third of our exports pass through New York. That city is probably the most important seaport in the world, for to this foreign trade is to be added a much larger amount of domestic trade by sea.

Next to New York in foreign trade is Boston, which receives one-eighth of the imports and sends out one-tenth of the exports of the country. New Orleans holds the next place. Although she receives but two per cent of the imports, she sends out ten per cent of the exports, which consist mainly of cotton. Philadelphia is fourth in rank, with six per cent of the imports and four per cent of the exports. Then comes Baltimore, which, though she receives but one per cent of the country's imports, sends out eight per cent of her exports. On the Pacific coast San Francisco is the only port which as yet has any prominence in foreign trade, and her share in it is but four per cent of the exports and imports. The Atlantic and Gulf coasts take about seven-eighths of the entire trade, and the Pacific coast only about one-sixteenth, an amount equal to that of the Great Lakes.

H. G.

THE PRESIDENCY OF THE NATIONAL GEOGRAPHIC SOCIETY

At a meeting of the Council of the National Geographic Society, held December 31, Prof. Alexander Graham Bell, LL. D., etc., was elected President of the Society.

GEOGRAPHIC LITERATURE

Eleventh Annual Report of the Interstate Commerce Commission. Advance copy without appendices. Pp. 150. Washington: Government Printing Office. 1897.

It was to be expected that the first report of the Interstate Commerce Commission issued after the rendering of the recent far-reaching decisions of the Supreme Court would be an interesting one, and such it proves.

The Interstate Commerce Commission has never claimed rate-making authority, but from its organization until early in 1897 it acted in accordance with the belief that when the legality of a rate, established in the first instance by a carrier subject to the act to regulate commerce, had been questioned by those interested, and the issue determined adversely to the carrier upon facts and arguments brought out during a formal investigation and hearing, of which both parties had had suitable notice and at which they had had opportunity to introduce testimony and cross-examine witnesses, it then became its duty, not merely to declare the particular rate excessive or unreasonable, and consequently unlawful, but, in addition, to decide what rate would be right, and subsequently to enforce, in the manner provided in the law, the latter rate. Congress, it was supposed by the Commission, had by implication granted this power as a necessary incident of express authority to execute and enforce an act requiring that all rates shall be reasonable and just. In a decision rendered during May, 1897, the United States Supreme Court declared this to be a misconception of the purpose and meaning of the act, and that Congress did not confer upon the Commission the limited authority to prescribe future charges which it had supposed itself to possess. Accepting this interpretation, the Commission believes that the same rule will be found, when occasion arises, to leave that body without authority, in the absence of amendatory legislation, to enforce any order to prevent unjust discrimination or undue preference in the future. The result is thus stated in the report:

> "The other sections and provisions of the law are in aid of and were intended to make effective the first three sections, which relate to and were intended to make unlawful and to prohibit unreasonable charges, unjust discriminations, and undue preferences; and without authority to make these three sections effective in the future practically all the Commission can do toward executing and enforcing the vital provisions of the act is to inquire into wrongs done in the past and report the result of its investigation to itself."

The inadequacy of so restricted a remedy for the evils incident to current methods of railway rate-making is obvious. The farmers who produce grain, cotton, live stock, and other commodities entering largely into interstate commerce are not as a rule shippers. They sell to dealers upon the basis of current rates, whether reasonable or the reverse, and

the latter are the actual shippers. If the reasonableness of previous charges only may be investigated, the remedy is necessarily limited to the collection of damages representing the difference between the rate actually charged and that which would have been reasonable and just. The only person in a position to collect these damages would be the one who had made the actual shipment, and to whom, having bought upon the basis of the rate paid, the amount collected would constitute an additional and unreasonable profit.

In the "Louisville and Nashville case," one of the earliest decided by the Commission, it was declared that the dissimilar circumstances justifying a higher charge for the short than for the long haul, under the fourth section of the law, might exist, (*a*) as a result of the competition of carriers by water; (*b*) as a result of competition by carriers not subject to the interstate commerce law; and (*c*), in rare and peculiar cases, as a result of competition of carriers subject to the law. Subsequently it was laid down that if the rate for the longer haul was controlled by unregulated competition, the carrier might make a lower charge, to meet such competition, without application to the Commission; but where the justifying competition alleged to exist was that of carriers subject to the law, application must be made to the Commission for permission to promulgate the lower rate, under the proviso permitting the Commission in special cases to make exemption from the general rule of the long and short haul clause. During November, 1897, the Supreme Court of the United States decided that competition of railway carriers subject to the act must be considered in cases arising under the fourth section, and that where it exists sufficiently to constitute a controlling force the circumstances are dissimilar. If therefore the Commission find the existence of such competition to a controlling degree, the rule of the fourth section is inapplicable. The Commission is apparently of the opinion that this construction practically eliminates the long and short haul clause from the law.

The Commission frankly acknowledges that its members are unable to agree as to the wisdom of authorizing pooling contracts. "A majority," says the report, "think it must occasion some improvement in the rate situation at almost all points, and that it might altogether amend it at many points." Though reminding the public that whatever beneficial results pooling may accomplish must be secured through the restriction of competition, a majority of the Commission are inclined to recommend that the experiment, surrounded by suitable safeguards, be tried. Something, it is admitted, must be done, and the insistence of the railways, whose officers are in a situation wisely to judge, that this is the proper remedy is entitled to careful attention. Protest is entered against the practice, akin to special pleading, of quoting a single sentence from some report of the Commission as evidence of an opinion favorable to pooling. The Commission is unanimous that to reverse the effect of the "Trans-Missouri decision," to repeal the anti-pooling clause and enact in its place a pooling bill, would be little better than a crime against the people, unless at the same time the Commission or some other tribunal was in-

vested with adequate powers of supervision and control. The following paragraphs are important enough to be given in full:

> "It should be further said that, while a majority of the Commission have felt that it would be wise to adopt the remedy suggested by the carriers in the present emergency, we do not admit that Congress is altogether powerless to correct this evil without the adoption of that means. The difficulty with enforcing the present law is not in its criminal features, which, with some slight changes, are well enough and strong enough, but in obtaining evidence of violations of that law. When those who have knowledge of what is actually done are put upon the witness stand, they refuse to disclose the truth."
>
> "Since these witnesses will not state the fact as it exists, some means must be provided of otherwise ascertaining that fact. So long as these gentlemen refuse to tell, it is necessary to provide a way by which the Government can find out for itself. If the interstate carriers of this country were compelled to keep their accounts in some prescribed form, and if the agents of the United States had the right at any time to inspect those accounts, or to take charge of one or more of the stations of a carrier when so advised, the effect must be to greatly diminish these practices. This kind of supervision would be no more rigorous than that under which national banks now exist."

The report also discusses the work of the Commission during the current year, uniform classification of freight, through routes and through rates, procedure in the courts on applications for the enforcement of the orders of the Commission, railway statistics, and other matters of importance. Previous recommendations in regard to legislation on these subjects are renewed. Attention is called to the recommendation of the Statistician in regard to the establishment of a bureau of railway statistics and accounts, and to the endorsement of the plan by the latest convention of state railroad commissioners. H. T. Newcomb.

PROCEEDINGS OF THE NATIONAL GEOGRAPHIC SOCIETY, SESSION 1897–'98

Special Meeting, November 12, 1897.—Vice-President Greely in the chair. Dr Sheldon Jackson gave an illustrated lecture on Alaska: a Trip to the Yukon and Klondike Gold Fields.

Excursion to the Naval Observatory, November 13, 1897.—Saturday evening excursion to the Naval Observatory by invitation of Commander Charles H. Davis, U. S. N.; attendance, about 400. Reception by the Superintendent and officers in the library. Parties were formed, in charge of officers and assistants, to visit the various departments and inspect the instruments and the magnetic observatory. On the return, the members and their guests called at "Twin Oaks" to pay their respects to President Hubbard, who had been prevented from attending the meeting by indisposition.

Regular Meeting, November 19, 1897.—Mr Henry F. Blount in the chair. The report of the committee appointed to audit the accounts of the

Treasurer was read and accepted. Papers were read, with lantern illustrations, by Mr Arthur P. Davis on The Pollution of Potomac Water, its Sources and Extent, and on The Effects and Remedies, by Passed Assistant Surgeon E. K. Sprague, of the Marine Hospital Service.

Special Meeting, November 26, 1897.—Mr W J McGee in the chair. Mr W. H. Holmes, of the National Museum, gave an illustrated lecture on The Ruined Cities of Yucatan.

Regular Meeting, December 3, 1897.—Mr W J McGee in the chair. Papers were read by Mr F. W. Hodge, of the Bureau of American Ethnology, on Acoma and the Enchanted Mesa, and by Dr Walter Hough on Indian Medicinal Plants of the Southwest. The first paper was illustrated by lantern slides.

Special Meeting, December 10, 1897.—Vice-President Greely in the chair. Professor E. A. Grosvenor, of Amherst College, gave an illustrated lecture on The Greek and the Turk: the Product of Geographic Environment.

Elections.—New members have been elected as follows:

November 13.—C. F. Frederick Adam, S. M. Becker, R. G. Campbell, Dr O. F. Cook, Miss Amelia R. Charles, L. A. Coolidge, R. B. Dashiell, U. S. N. Assistant Naval Constructor David G. Fairchild, Edward M. Fowler, George R. Ide, Miss Mary E. O'Connor, Lieut. J. G. Ord, U. S. A., Hon. Ellis H. Roberts, Alfred G. Safford, John Sherman, Dr Andrew H. Smith, Mrs Sterling H. Smith, Walter T. Swingle, Mrs Horatio N. Taplin, Miss Marion Thatcher, Mrs Julia C. Townsend, Rev. D. C. Weston, D.D., J. W. Witten, J. E. Woodman.

November 24.—Mrs E. F. Adams, Albert Carry, Dr J. B. Gregg Custis, Hon. J. L. Davenport, Miss Adelaide Fuller, Mrs E. C. Hobson, Miss Annie E. Johnston, Rev. R. H. McKim, D.D., John Meigs, Jr., Gen. J. K. Mizner, U. S. A., Mrs W. H. Osborn, Mrs M. C. Peabody, J. A. Pitman, George W. Rouzer, Dr E. K. Sprague, S. Sugenheimer, Mrs Adelia L. S. Thombs, Miss Ellen A. Vinton, Sanford N. Whitwell.

Portuguese East Africa. A concession has been granted for the construction of a railway from Beira to Tete, with the object of developing the Tete coal-fields.

British Central Africa. The trade of Chinde, the port of British Central Africa, at the mouth of the Zambesi, is said to be increasing rapidly. Chinde is now in direct telegraphic communication with Zomba and Blantyre.

Transvaal. The Industrial Commission reports that during 1896 out of the 183 gold mines in the Transvaal 79 produced gold to the value of £8,603,821. The remaining 104 produced no gold, most of them being merely in process of development. Only 25 companies declared dividends, the aggregate amount thus paid being £1,718,781.

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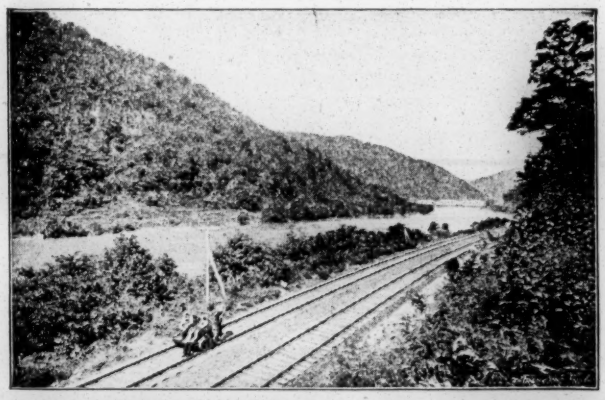

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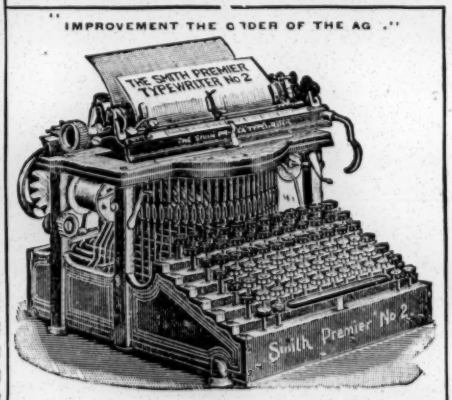

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